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Notice of Allowability	Application No.	Applicant(s)	
	09/910,631	MILLER ET AL.	
	Examiner	Art Unit	
	Paul A Baker	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 10 June 2004.
2. ☒ The allowed claim(s) is/are 1-22.
3. ☒ The drawings filed on 20 July 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Charles Fish, Reg. No. 35,870 on 22 September 2004.

The application has been amended as follows:

Substitute claim 1 with the following:

1. A multiprocessor system, comprising:
 - a processing sub-system including a plurality of processors and a processor memory system;
 - a network operable to couple the processing sub-system to an input/output (I/O) sub-system;
 - the sub-system including a plurality of I/O interfaces each operable to couple a peripheral device to the multiprocessor system;
 - ~~the interfaces each including a local memory operable to store a copy of data~~
from the processor memory for use by a corresponding peripheral device and to invalidate the copy at a first time event;
 - a directory for processor memory system, the directory operable to identify the data as owned upon providing the copy to the I/O sub-system and to identify the data as unowned at a second time event; and

wherein the invalidation of data in an I/O interface and the directory identifying the data as unowned are performed without notification messaging between the I/O interface and directory.

Substitute claim 9 with the following:

9. A method for managing data in an input/output (I/O) interface for a multiprocessor system, comprising:

- coupling a plurality of processors to a processor memory system;
- coupling a plurality of I/O interfaces to the processor memory system;
- coupling a peripheral device to each I/O interface;
- storing a copy of data from the processor memory system in an I/O interface for use by a corresponding peripheral device;
- invalidating the copy in the I/O interface at a first time event;
- identifying the data as owned upon providing the copy to the I/O interface;
- automatically identifying the data as unowned at a second time event; and
- wherein the invalidation of data in the I/O interface and identifying the data in the processor memory system as unowned are performed without notification messaging between the I/O interface and processor memory system.

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance:

Bourne et al., US PG PUB 2003/0120875, represents the closest available art of record. Bourne discloses a web cache, which automatically invalidates entries after the expiration of a time period. The examiner was unable to find a similar time invalidation daemon within a directory which would provide proper motivation for combination with Bourne such that the cache entry in question is both invalidated at the I/O cache and its coherency information updated at the directory without any communication occurring between the cache and directory related to the invalidation of said entry. For this reason, claim 1 and all its dependents are found allowable over the art of record.

Similarly, the examiner was unable to find an time invalidation daemon within a memory system which would provide proper motivation for combination with Bourne such that the cache entry in question is both invalidated at the I/O cache and its coherency information updated in the memory system without any communication occurring between the cache and memory system related to the invalidation of said entry. For this reason, claims 9, 18, 21 and all their dependents are found allowable over the art of record.

None of the prior art of record discloses a system where data checked out to an I/O cache, which is automatically invalidated after a period of time and where the data is provided to the I/O cache in an exclusive read-only state, in combination of the other specified claim limitations. For this reason claims 8, 17 and 22 are found allowable over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

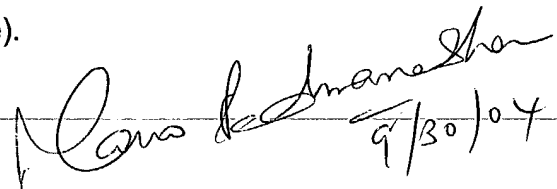
accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A Baker whose telephone number is (703)305-3304. The examiner can normally be reached on M-F 10am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703)306-2903. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


PB


9/30/04

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER